# 承　　認　　書

# SPECIFICATION FOR APPROVAL

| | | | |
|---|---|---|---|
| 客　　戶：<br>CUSTOMER | **LOMEX** | 承認圖號：<br>APP. NO. | **D14040805T-A** |
| 系　　列：<br>SERIES | **EV** | 使用溫度範圍：<br>OPERATION TEMP. RANGE | **-55~+105℃** |

| 本公司料號 VENDOR'S PART NO. | 貴公司料號 BUYER'S PART NO. |
|---|---|
| **VEV227M050S0ANH030** | |

| 貴 公 司 承 認 印<br>BUYER'S APPROVAL STAMP | 智寶電子(東莞)有限公司<br>TEAPO ELECTRONICS(Dong guan) CORPORATION<br>智寶電子(東莞)有限公司 發行 2014.04.08 技術部 | |
|---|---|---|
| | APPROVED BY: | TESTED BY: |
| | 姜 2014.04.08 建華 | 姜 2014.04.08 媛媛 |

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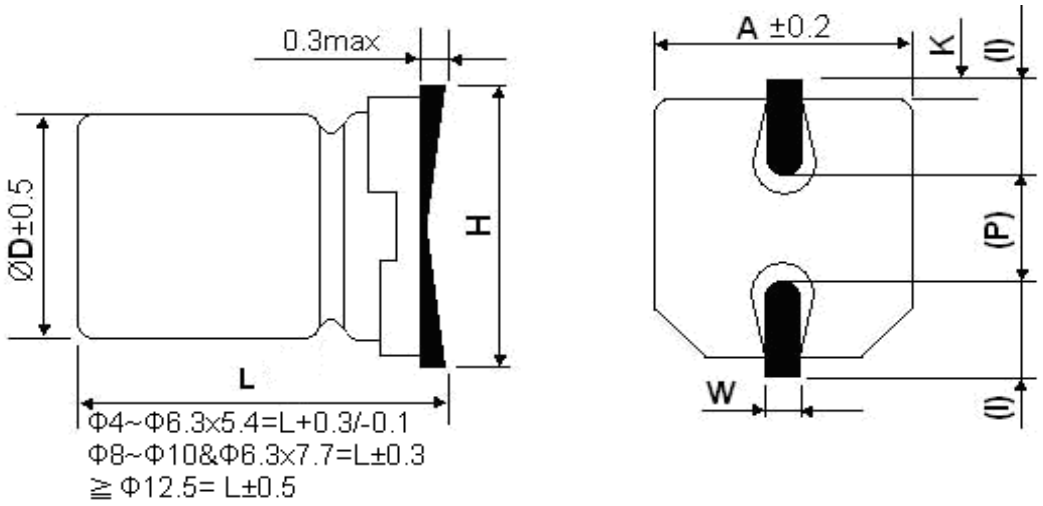
## Ⅰ. Scope

This standard defines characteristics and dimensions for aluminum electrolytic capacitors named EV series for Untra Low Impedance Series

## Ⅱ. Diagram of Dimensions




＊ ( )：Reference size

| ΦD | L | A | H | I | W | P | K | |
|---|---|---|---|---|---|---|---|---|
| 4.0 | 5.4 | 4.3 | 5.5 Max | 1.8 | 0.65±0.1 | 1.0±0.2 | 0.35 | +0.15<br>-0.20 |
| 5.0 | 5.4 | 5.3 | 6.5 Max | 2.2 | 0.65±0.1 | 1.5±0.2 | 0.35 | +0.15<br>-0.20 |
| 6.3 | 5.4 | 6.6 | 7.8 Max | 2.6 | 0.65±0.1 | 1.8±0.2 | 0.35 | +0.15<br>-0.20 |
| 6.3 | 7.7 | 6.6 | 7.8 Max | 2.6 | 0.65±0.1 | 1.8±0.2 | 0.35 | +0.15<br>-0.20 |
| 8.0 | 6.2 | 8.3 | 9.5 Max | 3.4 | 0.65±0.1 | 2.2±0.2 | 0.35 | +0.15<br>-0.20 |
| 8.0 | 10.2 | 8.3 | 10.0 Max | 3.4 | 0.90±0.2 | 3.1±0.2 | 0.70±0.20 | |
| 10.0 | 10.2 | 10.3 | 12.0 Max | 3.5 | 0.90±0.2 | 4.6±0.2 | 0.70±0.20 | |
| 12.5 | 13.5 | 13.0 | 15.0 Max | 4.8 | 1.20±0.2 | 4.4±0.2 | 0.70±0.30 | |
| 12.5 | 16 | 13.0 | 15.0 Max | 4.8 | 1.20±0.2 | 4.4±0.2 | 0.70±0.30 | |
| 16 | 16.5 | 17.0 | 19.0 Max | 6.3 | 1.20±0.2 | 6.4±0.2 | 0.70±0.30 | |

## Ⅲ. Characteristics

**Standard test condition**

Unless otherwise specified all tests shall be performed at, or referred to, an ambient temperature of 20℃ and a relative humidity not greater than 60%.

**Operating Temperature Range**

－55~+105℃

**Shipping Temperature**

-40℃ ~+70℃

### 1. Electrical characteristics

**(1). Rated Voltage and Surge Voltage**

WV: Working Voltage (VDC)

SV: Surge Voltage (V)

| Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 |
|---|---|---|---|---|---|---|---|---|---|
| Surge Voltage(V) | 8 | 13 | 20 | 32 | 44 | 63 | 79 | 100 | 125 |

**(2). Leakage Current**

The maximum leakage current is specified in the following formula after DC working voltage applied .

I≦0.01CV or 3（uA），whichever is greater.

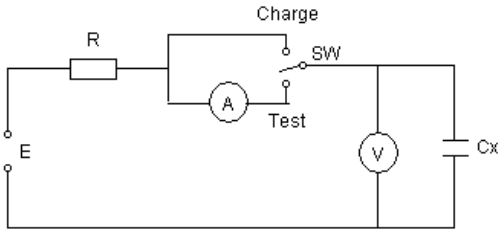
After rated voltage applied for 2 minutes.

where I: Leakage Current ( $\mu$ A)

C: Nominal Capacitance ( $\mu$ F)

V: Rated Voltage (V)

Measurement circuit




**(3). Capacitance Tolerance**

Capacitance tolerance should be within the range of ±20% which is measured at 120Hz/20℃

**(4). Dissipation Factor**

Dissipation Factor at 120Hz/ 20℃ shall not exceed the values given in the table of standard rating. Refer to 「Table of specification and characteristics」on Page 10 for details.

**(5). Low Temperature Characteristics**

The ratio of impedance at -25℃/+20℃ and -40℃/+20℃ of the capacitor shall be less than the following value at 120Hz.

| WV / Z(120Hz) | 6.3 | 10 | 16 | 25 | 35 | 50~100 |
|---|---|---|---|---|---|---|
| Z(-25℃) / Z(+20℃) | 2 | 2 | 2 | 2 | 2 | 2 |
| Z(-40℃) / Z(+20℃) | 3 | 3 | 3 | 3 | 3 | 3 |

**(6). Multiplier for Ripple Current**

Frequency coefficient

| Frequency (Hz) | 120 | 1K | 10K | 100K |
|---|---|---|---|---|
| Coefficient | 0.70 | 0.80 | 0.90 | 1.00 |

## 2. Endurance characteristics

**(1).Ripple Life**

To put capacitors into the oven which is staying at 105±2℃,then to add rated voltage in the capacitors. This experiment will be lasted for 2000+12/-0 hours. We will examine the electric characteristics after getting them cooled down to room temperature. The values must not be over those on following table.

| | |
|---|---|
| Capacitance Change | Within ±30% of initial value |
| Dissipation Factor | Not more than 200% of specified value |
| Leakage Current | Not more than the specified value |

**(2). Shelf Life**

The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them at 105±2℃ for 1000+12/-0 hours without voltage applied.

| | |
|---|---|
| Capacitance Change | Within ±30% of initial value |
| Dissipation Factor | Not more than 200% of specified value |
| Leakage Current | Not more than the specified value |

**(3). Solderability Test**

The following specifications shall be satisfied when the lead wires are tested in solder bath at 245±5$^0$C for 2.5±0.5 seconds, more than 95% of the terminal surface shall be covered with new solder.

**(4). Solder Heat Resistance Test**

The following specifications shall be satisfied when the lead wires are tested in solder bath at 275+2/-0$^0$C for 20±0.5 seconds.

| | |
|---|---|
| Capacitance Change | ≦±5% of the initial value |
| Dissipation factor | ≦Initial specified value |
| Leakage Current | ≦Initial specified value |

### (5). Reflow Soldering Heat Resistance Test

After reflow soldering , the following specifications shall be satisfied when the capacitors are restored to 20℃.

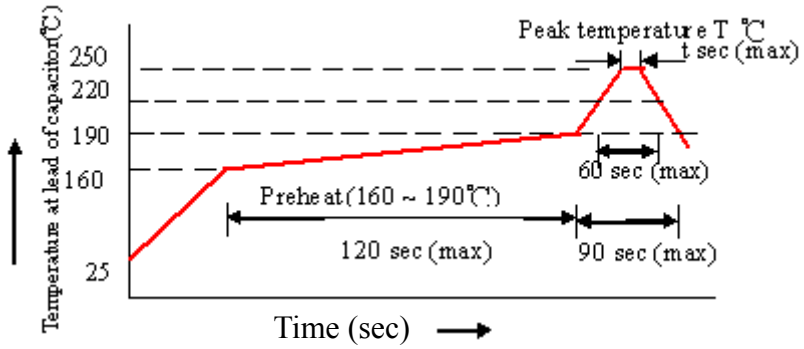
| | |
|---|---|
| Capacitance Change | Within ±10% of the initial value |
| Dissipation Factor | Not more than the specified value |
| Leakage Current | Not more than the specified value |

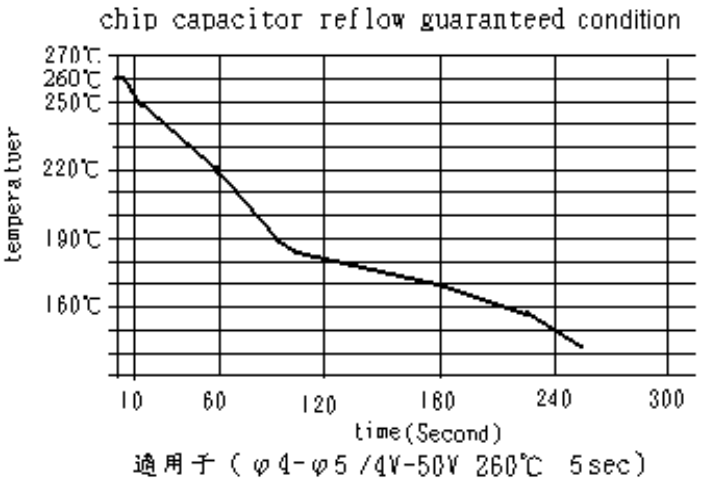
### (6). Lead Free Reflow Soldering Condition

(1)For reflow, use a thermal conduction system such as infrared radiation (IR) or hot blast. Vapor heat transfer systems (VPS) are not recommended.

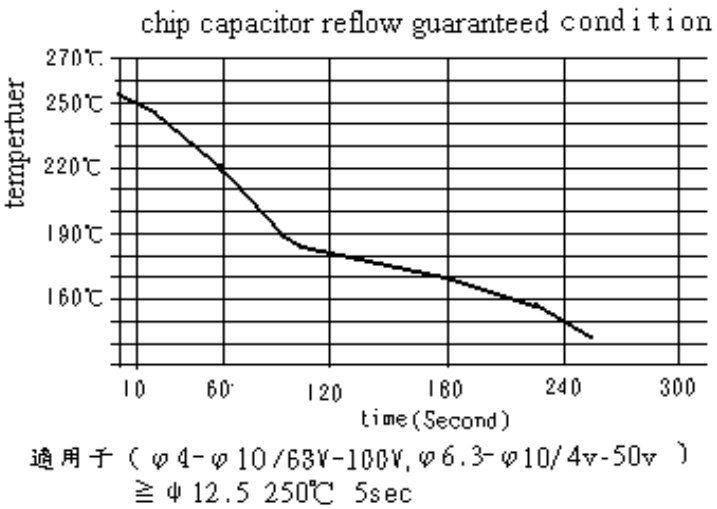
(2)Observe proper soldering conditions (temperature, time ,etc.).Do not exceed the specified limits.

(3) Reflow could be performed twice. Please make sure the parts have enough cooling down time between the first and second soldering process.




適用于（φ4-φ5 /4V-50V 260℃ 5sec）




適用于（φ4-φ10/63V-100V,φ6.3-φ10/4v-50v ）
≧φ12.5 250℃ 5sec

## Ⅳ. Mounting

The paper separators and the electrolytic-conductive electrolytes in a non-solid aluminum electrolytic capacitor is flammable.

Leaking electrolyte on a PC board can gradually erode the copper traces, possibly causing smoke or burning by short-circuiting the copper traces.

Verify the following points when designing a PC board.

(1) Provide the appropriate hole spacing on the PC board to match the terminal spacing of the capacitor.

(2) Do not place any wires or copper traces over the vent of the capacitor.

(3) Installing a capacitor with the vent facing the PC board needs an appropriate ventilation hole in PC board.

(4) Do not pass any copper traces beneath the seal side of a capacitor.
The trace must pass 1 or 2 mm to the side of the capacitor.

(5) Avoid placing any heat-generating objects adjacent to a capacitor or even on the reverse side of the PC board.

(6) Do not pass any via holes or underneath a capacitor.

(7) In designing double-sided PC boards, do not locate any copper trace under the seal side of a capacitor.

## Ⅴ. Storage Condition

(1) Aluminum Electrolytic Capacitors should not be stored in high temperatures or where there is a high level of humidity. The suitable storage condition is 5~35℃ and less than 75% in relative humidity.

(2) Aluminum Electrolytic Capacitors should not be stored in damp conditions such as water, saltwater spray or oil spray.

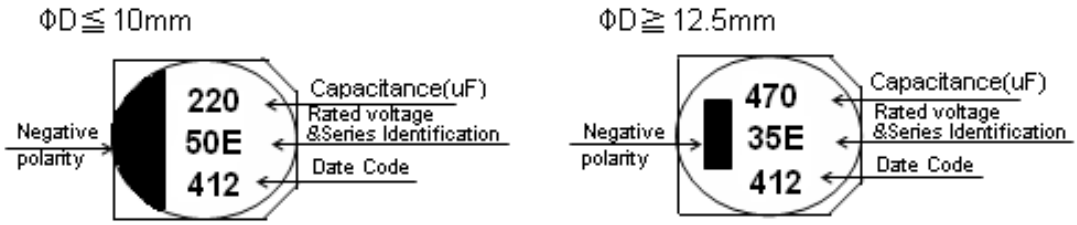
(3) Do not store Aluminum Electrolytic Capacitors in an environment full of hazardous gas (hydrogen sulfide , sulfurous acid gas, nitrous acid, chlorine gas, ammonium, etc…).

(4) Aluminum Electrolytic Capacitors should not be stored under exposure to ozone, ultraviolet rays or radiation.

(5) If a capacitor has been stored for more than one year under normal temperature (shorter if high temperature) and it shows increased leakage current, then a treatment by voltage application is recommended.

## Ⅵ. Marking

（1）Following items shall be marked on the body of Capacitor.
(Note: color of the marking is black)




a) Rated Working Voltage
b) Nominal Capacitance
c) Negative polarity
d) Series mark
e) Date Code

**Remark**: Date code numbering system：

Manufactured year

| Code | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |

Manufactured month

| Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C |

Manufactured address

| address | Taiwan | Dongguan | Suzhou |
|---|---|---|---|
| Code | 1 | 2 | 3 |

（2）On the Taping Reel

a) Rated working voltage, rated capacitance

b) Teapo electric trademark

c) Part number

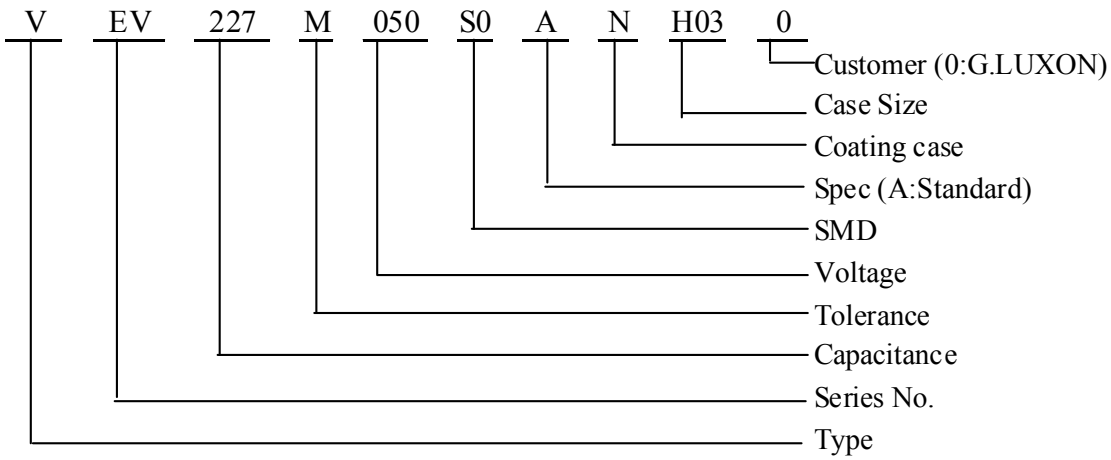
d) Packing quantity

e) Serial No.

f) Manufacturer’s Name (Teapo Electronics corporation)

## Ⅶ. Catalog numbering

G.LUXON EV TYPE (Part Number)




Type code:

| Code | Model Type |
|---|---|
| D | Standard Dip Type (PVC sleeve) |
| K | Standard Dip Type (PET sleeve) |
| V | SMD (V-chip) Type (Nylon coating) |
| L | Snap-in Type (PVC sleeve) |
| S | Snap-in Type (PET sleeve) |
| P | Conductive Polymer Solid Capacitor |

Capacitance code:

| Capacitance | 0.47 | 4.7 | 47 | 470 | 4700 |
|---|---|---|---|---|---|
| Code | 474 | 475 | 476 | 477 | 478 |

Capacitance tolerance:

M = ±20% , K = ±10% ,V = +20～－10%

Voltage Code:

| Voltage | 2.5 | 4 | 6.3 | 10 | 16 |
|---|---|---|---|---|---|
| Code | 2R5 | 004 | 6R3 | 010 | 016 |

Code 13 Special specification:

A : Standard D : Impedance
B : DF (tanδ) E : Ripple current
C : ESR F : Leakage current
G : Convex rubber

Code 14 Sleeve code:

N : SMD standard pack & solid capacitor

Code 15~17 Size Code:

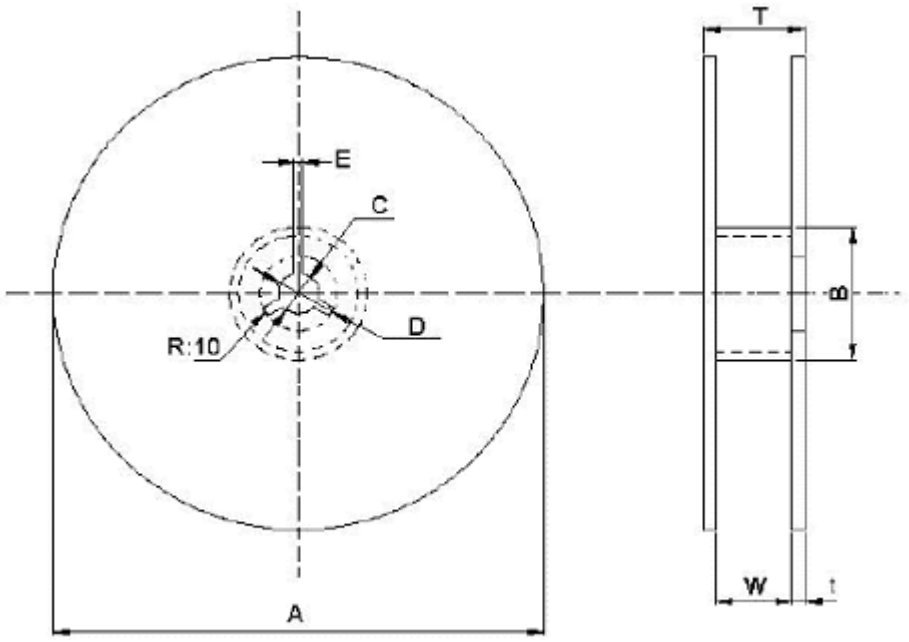
| φ DxL | 4X5.4 | 5X5.4 | 6.3X5.4 | 6.3X7.7 | 8X6.2 | 8X10.2 | 10X10.2 | 12.5X13.5 | 12.5X16 | 16X16.5 |
|---|---|---|---|---|---|---|---|---|---|---|
| Size Code | B01 | C01 | E01 | E04 | G02 | G03 | H03 | K05 | K06 | M06 |

Code 18

Other special instructions (“ K ” for standard)

## Ⅷ.Packaging specification

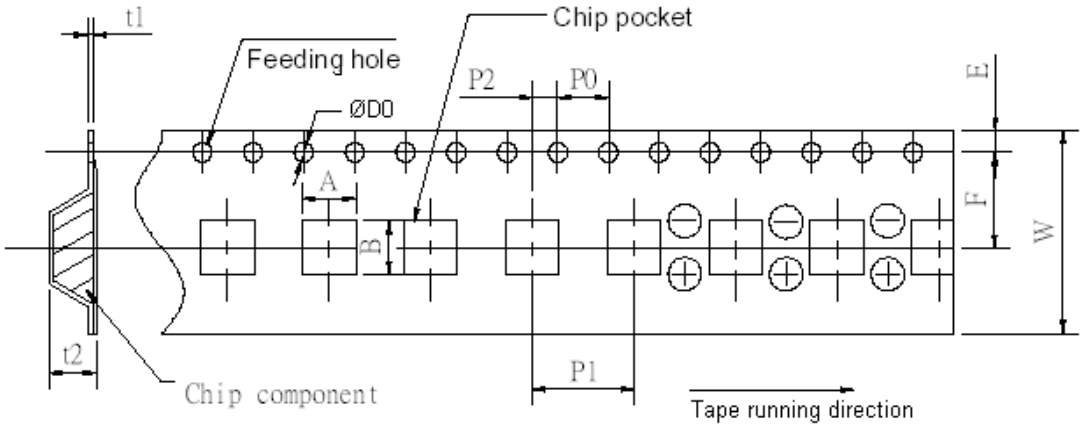
**・Reel Dimensions in mm(not to scale)**




| Size | A | B | C | D | E | W | T | t |
|---|---|---|---|---|---|---|---|---|
| 4 φ ~ 5 φ | 380±2 | 50min | 13.0±0.5 | 21.0±0.8 | 2.0±0.5 | 14±1 | 20±1 | 3.0 |
| 6.3 φ ~ 8× 6.2 | 380±2 | 50min | 13.0±0.5 | 21.0±0.8 | 2.0±0.5 | 18±1 | 24±1 | 3.0 |
| 8×10.2 ~ 10 φ | 380±2 | 50min | 13.0±0.5 | 21.0±0.8 | 2.0±0.5 | 26±1 | 32±1 | 3.0 |
| 12.5 φ | 380±2 | 50min | 13.0±0.5 | 21.0±0.8 | 2.0±0.5 | 34±1 | 40±1 | 3.0 |
| 16 φ | 380±2 | 50min | 13.0±0.5 | 21.0±0.8 | 2.0±0.5 | 46±1 | 52±1 | 3.0 |

**· Reel Tape**

**Taping Dimensions in mm (not to scale)**




*Ask factory for technical specifications.

| SIZE | W | A | B | Po±0.1 | P1 | P2±0.1 | F | ϕ Do | t1 | E | t2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4x5.4 | 12.0 | 4.7 | 4.7 | 4.0 | 8.0 | 2.0 | 5.5 | 1.5+0.1-0 | 0.4 | 1.75 | 5.8 |
| 5x5.4 | 12.0 | 5.7 | 5.7 | 4.0 | 12.0 | 2.0 | 5.5 | 1.5+0.1-0 | 0.4 | 1.75 | 5.8 |
| 6.3x5.4 | 16.0 | 7.0 | 7.0 | 4.0 | 12.0 | 2.0 | 7.5 | 1.5+0.1-0 | 0.4 | 1.75 | 5.8 |
| 6.3x7.7 | 16.0 | 7.0 | 7.0 | 4.0 | 12.0 | 2.0 | 7.5 | 1.5+0.1-0 | 0.4 | 1.75 | 8.3 |
| 8x6.2 | 16.0 | 8.7 | 8.7 | 4.0 | 12.0 | 2.0 | 7.5 | 1.5+0.1-0 | 0.4 | 1.75 | 6.8 |
| 8x10.2 | 24.0 | 8.7 | 8.7 | 4.0 | 16.0 | 2.0 | 11.5 | 1.5+0.1-0 | 0.4 | 1.75 | 11.0 |
| 10x10.2 | 24.0 | 10.7 | 10.7 | 4.0 | 16.0 | 2.0 | 11.5 | 1.5+0.1-0 | 0.4 | 1.75 | 11.0 |
| 12.5x13.5 | 32.0 | 13.4 | 13.4 | 4.0 | 24.0 | 2.0 | 14.2 | 1.5+0.1-0 | 0.5 | 1.75 | 14.0 |
| 12.5x16 | 32.0 | 13.4 | 13.4 | 4.0 | 24.0 | 2.0 | 14.2 | 1.5+0.1-0 | 0.5 | 1.75 | 17.5 |
| 16x16.5 | 44.0 | 17.5 | 17.5 | 4.0 | 28.0 | 2.0 | 20.2 | 1.5+0.1-0 | 0.5 | 1.75 | 17.5 |

**· Packaging Specification**

| Size (mm) | Q'ty per reel | box / measurement (mm) | |
|---|---|---|---|
| 4x5.4 | 2000PCS | 20,000PCS | 390x195x395 |
| 5x5.4 | 1000PCS | 10,000PCS | 390x195x395 |
| 6.3x5.4& 6.3x7.7 | 1000PCS | 10,000PCS | 390x235x405 |
| 8x6.2 | 1000PCS | 10,000PCS | 390x235x405 |
| 8x10.2 | 500PCS | 4,000PCS | 390x255x405 |
| 10x10.2 | 500PCS | 4,000PCS | 390x255x405 |
| 12.5x13.5 | 200PCS | 800PCS | 390x255x405 |
| 12.5x16 | 150PCS | 600PCS | 390x255x405 |
| 16x16.5 | 125PCS | 500PCS | 390x255x405 |

## Ⅸ. Others

(1) All Teapo capacitors comply to RoHS(Restriction of Hazardous Substances) requirements where Chromium Ⅵ(Cr+6),Cadmium(Cd) , Mercury(Hg), Lead(pb), Polybrominated biphenyls(PBBs)and Polybrominated biphenyl/diphenyl ethers (PBBEs/PBDEs) have not been detected [lower than MDL (Method Detection Limit)] per SGS certification test report..

(2)Satisfied characteristic JIS C 5101

(3)Aluminum Electrolytic Capacitors may b e damaged by corrosion which is caused by any halogenated hydrocarbon solvents.

Please let us know in advance the solvent name and conditions for your PCB cleaning

Table of specification and characteristics

| NO | 料號 Part NO | 靜電容量 CAP(uF) 120HZ 20℃ | 工作電壓 WV | 損失角 DF(%) (MAX) 120HZ 20℃ | 阻抗值 Z (mΩ) (MAX) 100KHZ 20℃ | 洩漏電流 LC(μA) (MAX) 20℃ | 濾波電流 RC(mArms) (MAX) 100KHZ 105℃ | 濾波壽命 Ripple Life (Hrs) 105℃ | 尺寸 Dimensions(mm) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | ψD | L | P |
| 1 | VEV227M050S0ANH030 | 220 | 50 | 12 | 300 | 110 | 500 | 2000 | 10 | 10.2 | 4.6 |